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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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Published:
- *with international search report*
- *with amended claims*

(88) Date of publication of the international search report: 4 April 2002

Date of publication of the amended claims: 2 May 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/82945 A3

(54) Title: THE USE OF BACTERIAL PHAGE ASSOCIATED LYSING ENZYMES FOR TREATING VARIOUS ILLNESSES

(57) Abstract: A composition and method for treating bacterial infections is disclosed which comprises the treatment of an individual with an effective amount of at least one lytic enzyme produced by a bacteria infected with a bacteriophage specific for said bacteria wherein at least one lytic enzyme is selected from the group consisting of shuffled lytic enzymes, chimeric lytic enzymes, holin enzymes, and combinations thereof. A carrier may be used for delivering the lytic enzyme. This method, and composition can be used for the treatment of upper respiratory infections, skin infections, wounds, and burns, vaginal infections, eye infections, intestinal disorders and dental problems.

AMENDED CLAIMS
[received by the International Bureau on 29 January 2002 (29.01.02);
original claims 1-151 replaced by amended claims 1-41 (7 pages)]

1. A method for treating bacterial infection, comprising the steps:

a) obtaining a composition comprising an effective amount of at least one lytic enzyme wherein the lytic enzyme is coded for by a bacteriophage specific for a specific bacteria causing the bacterial infection and the lytic enzyme is selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes and combinations thereof; and

b) applying the composition to a site of the infection.

2. The method of claim 1, wherein the method for treating bacterial infections comprises the prophylactic treatment of infections.

3. The method of claim 1, wherein the method for treating bacterial infections comprises the therapeutic treatment of infections.

4. The method of claim 1, wherein the method further comprises including at least one holin protein in the composition.

5. The method of claim 4, wherein the at least one holin protein is selected from the group consisting of chimeric holin lytic protein and shuffled lytic protein.

6. The method of claim 1, wherein the composition further comprises at least one antibiotic that potentiates the bactericidal activity of the lytic enzyme.

7. The method of claim 1, further comprising a non recombinant lytic enzyme

8. The method of claim 1, further comprising delivering the at least one lytic enzyme in a carrier suitable for delivering the lytic enzyme to the site of the infection.

9. The method of claim 1, wherein the at least one lytic enzyme is active against a bacterium selected from the group consisting of *Pseudomonas, Streptococcus*

pneumoniae, Streptococcus fasciae. Listeria. Salmonella. E. coli, Campylobacter, Helicobacter pylori. Pseudomonas. Streptococcus mutans. Mycobacterium tuberculosis and Streptococcus.

10. The method of claim 1, wherein the carrier is selected from the group consisting of an inhalant, a topical cream, a nasal spray, a syrup, a tablet, tampon, a suppository, an eye drop solution, a candy, a chewing gum, a lozenge, a troche, a powder, an aerosol, a liquid, a liquid spray, a bandage, a toothpaste and an oral wash.

11. A composition for the treatment of a bacterial infection of an upper respiratory tract, prepared by a process comprising the steps of:

a) obtaining at least one lytic enzyme coded for by a bacteriophage specific for a bacteria causing the bacterial infection, the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria; and

b) admixing the at least one lytic enzyme with a carrier suitable for delivery to a mouth, throat, or nasal passage.

12. The composition of claim 11, wherein the carrier is selected from the group consisting of a candy, chewing gum, lozenge, troche, tablet, a powder, an aerosol, a liquid and a liquid spray.

13. A composition for the treatment of a bacterial infection of the digestive tract, prepared by a process comprising the steps of:

a) obtaining at least one lytic enzyme wherein the at least one lytic enzyme is coded for by a bacteriophage specific for a bacteria causing the bacterial infection , the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria; and

b) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme to the digestive tract.

14. The composition of claim 13, wherein the carrier for delivering the at least one lytic enzyme to the digestive tract is selected from the group consisting of suppository enemas, syrups, and enteric coated pills.

15. A composition for the therapeutic or prophylactic treatment of bacterial infections of burns and wounds of the skin, comprising:

a) obtaining at least one lytic enzyme coded for by a bacteriophage specific for the bacteria causing the bacterial infections, the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

b) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme, and a carrier for suitable for delivering the at least one lytic enzyme to the skin.

16. The composition of claim 15, wherein the carrier is a bandage.

17. A method for the therapeutic or prophylactic treatment of bacterial infections of burns and wounds of the skin, comprising:

a) obtaining a composition comprising an effective amount of at least one lytic enzyme, wherein the composition is prepared by the steps of:

1) obtaining at least one lytic enzyme coded for by a bacteriophage specific for the bacteria causing the bacterial infections wherein at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

2) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme to the burns and the wounds; and

b) applying the composition to a site of the burns and wounds of the skin.

18. The method of claim 17, wherein the carrier is a bandage.

19. The method of claim 17, wherein the bacteria being treated is *Staphylococcus*.

20. A method for the prophylactic and therapeutic treatment of vaginal infections, comprising:

a) obtaining a composition comprising an effective amount of at least one lytic enzyme, wherein the composition is prepared by the steps of:

1) obtaining at least one lytic enzyme coded for by a bacteriophage specific for the bacteria the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria; and

2) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme to the vagina; and

b) applying the composition to the vagina.

21. The method of claim 20, wherein the carrier is selected from the group consisting of a tampon, pad, and douche.

22. A composition for the treatment of bacterial infection of a vagina, prepared by a process comprising the steps of:

a) obtaining at least one lytic enzyme coded for by a bacteriophage specific for the bacteria the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria; and

b) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme to the vagina.

23. The composition of claim 22, wherein the carrier is a tampon.

24. The composition of claim 22, wherein the carrier is a douche.

25. The composition of claim 22, wherein the carrier is a pad.

26. A method for treating bacterial infections of an eye comprising the steps of:

a) obtaining a composition comprising an effective amount of at least one lytic enzyme, wherein the composition is prepared by the steps of:

1) obtaining at least one lytic enzyme wherein the at least one lytic enzyme is genetically coded for by a bacteriophage specific for the bacteria the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

2) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme, to the eye; and

b) applying the composition to the eye.

27. The method of claim 26, wherein the carrier is an eye drop solution.

28. The method of claim 26, wherein the carrier is an eye wash solution.

29. The method of claim 26, wherein the solution is an isotonic solution.

30. A composition for the treatment of a bacterial infection of the digestive tract, prepared by a process comprising the steps of:

a) obtaining at least one lytic enzyme coded for by a bacteriophage specific for the bacteria infecting the digestive tract the at least one lytic enzyme selected being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

b) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme to the digestive tract.

31. The composition of claim 30, wherein the carrier is an isotonic solution.

32. A method for the prophylactic or therapeutic treatment of dermatological infections comprising:

a) obtaining a composition comprising an effective amount of at least one lytic enzyme, wherein the composition is prepared by the steps of:

1) obtaining at least one lytic enzyme wherein the at least one lytic enzyme is genetically coded for by a bacteriophage specific for bacteria causing the bacterial infections, the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

2) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme to the skin; and

b) topically applying the composition to the skin.

33. The method of claim 32, wherein the form in which the composition is delivered is selected from the group consisting of a spray, a smear, a time release patch, a liquid absorbed wipe, and any combination thereof.

34. The method of claim 32, wherein the composition further comprises at least one complementary agent which potentiates the bactericidal activity of the lytic enzyme, the complementary agent being an antibiotic.

35. A composition for treating bacterial infections of the mouth or teeth, prepared by a process comprising the steps of:

a) obtaining at least one lytie enzyme coded for by a bacteriophage specific for the bacteria causing the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, and wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

b) admixing the at least one lytic enzyme with a carrier suitable for delivery of the at least one lytic enzyme, and a carrier for suitable for delivering the at least one lytic enzyme to the mouth or teeth.

36. The composition of claim 35, wherein the carrier is selected from the group consisting of a toothpaste, an oral wash, a chewing gum and a lozenge.

37. A method for parenterally treating bacterial infections, comprising the steps of:

a) obtaining a composition comprising an effective amount of at least one lytic enzyme, wherein the composition is prepared by the steps of:

1) obtaining at least one lytic enzyme coded for by bacteriophage specific for the bacteria the at least one lytic enzyme being selected from the group consisting of chimeric lytic enzymes, shuffled lytic enzymes, and combinations thereof, wherein the at least one lytic enzyme has the ability to digest a cell of the bacteria, and

2) admixing the at least one lytic enzyme with a carrier suitable for parenterally delivering the at least one lytic enzyme, and

b) parenterally administering the composition to a site of the infection.

38. The method of claim 37, wherein the composition is administered intravenously, intramuscularly or subcutaneously.

39. The method of claim 37, wherein the composition further comprises at least one complementary agent which potentiates the bactericidal activity of the lysin enzyme, the complementary agent being an antibotic.

40. The method of claim 37, wherein the carrier comprises distilled water, a saline solution, albumin, a serum, or any combination thereof.

41. The method of claim 37, wherein the carrier further comprises DMSO.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
HELLER EHRMAN WHITE & McAULIFFE , L LP
Attn. Sandercock , Colin , G.
1666K Street , NW
suite 300
Washington , DC 20006
UNITED STATES OF AMERICA

Date of mailing *(day/month/year)* 29/11/2001

Applicant's or agent's file reference
38228-0005

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
PCT/US 01/13649

International filing date *(day/month/year)* 30/04/2001

Applicant
NEW HORIZONS DIAGNOSTIC CORPORATION et al.

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority
European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer
Catherine Humbert

Form PCT/ISA/220 (July 1998)

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
38228-0005		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US 01/ 13649	30/04/2001	28/04/2000

Applicant

NEW HORIZONS DIAGNOSTIC CORPORATION et al.

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 8 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

[ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

[ ] contained in the international application in written form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readble form.

[ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [X] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

[X] the text is approved as submitted by the applicant.

[ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

[X] the text is approved as submitted by the applicant.

[ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. _____

[ ] as suggested by the applicant.

[ ] because the applicant failed to suggest a figure.

[ ] because this figure better characterizes the invention.

[X] None of the figures.

International Application No
PCT/US 01/13649

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K38/46 A61P31/00 A61P15/02 A61P17/02 A61P27/02
A61P1/00 A61P11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
BIOSIS, EPO-Internal, MEDLINE, CHEM ABS Data, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 510 907 A (AGRICULTURAL & FOOD RES) 28 October 1992 (1992-10-28) page 2, line 1 -page 3, line 6; claims 1,5,6	27-56, 77-85, 95-98, 100-102, 115-124, 147-151
X	WO 97 02351 A (CIBA GEIGY AG ;UNIV CAMBRIDGE TECH (GB); LUZIO JOHN PAUL (GB); BRY) 23 January 1997 (1997-01-23) page 1, paragraph 1; claims 1,20-22 page 2, paragraph 1 page 6, paragraph 4 -page 7, paragraph 3	38-46, 95-98, 101,102, 147-151

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 November 2001	29/11/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Charles, D

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 07329 A (UNIV MARYLAND) 14 March 1996 (1996-03-14) page 1, line 2 - line 8; claims 1-5,12,13,19,20,55 page 5, line 17 - line 20 page 7, line 28 -page 8, line 12 page 10, line 29 -page 11, line 7 page 12, line 20 - line 29	115-124, 147-151
X,P	US 6 056 954 A (FISCHETTI VINCENT A ET AL) 2 May 2000 (2000-05-02) cited in the application the whole document	27-56, 77-85, 95-102, 115-124, 147-151
X,P	US 6 056 955 A (FISCHETTI VINCENT ET AL) 2 May 2000 (2000-05-02) cited in the application the whole document	27-37, 47-53, 77-85, 95-98, 101,102, 115-124, 147-151
X,P	NELSON D ET AL: "Prevention and elimination of upper respiratory colonization of mice by group A streptococci by using a bacteriophage lytic enzyme." PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, (2001 MAR 27) 98 (7) 4107-12. , XP002165225 the whole document	27-37, 147-151
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	DATABASE BIOSIS 'Online! BIOSCIENCES INFORMATION SERVICE, PHILADELPHIA, PA, US; 1998 BIZIULEVICHIUS GEDIMINAS ARVYDAS ET AL: "In vivo studies on lysosubtilin: 3. Efficacy for treatment of mastitis and superficial lesions of the udder and teats in cows." Database accession no. PREV199800492606 XP002183274 abstract & VETERINARY RESEARCH (PARIS), vol. 29, no. 5, 1998, pages 441-456, ISSN: 0928-4249	147-151
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SHEEHAN MICHELLE M ET AL: "The lytic enzyme of the pneumococcal phage Dp-1: A chimeric lysine of intergeneric origin." MOLECULAR MICROBIOLOGY, vol. 25, no. 4, 1997, pages 717-725, XP000922620 ISSN: 0950-382X the whole document	147-151
A	US 5 997 862 A (FISCHETTI VINCENT ET AL) 7 December 1999 (1999-12-07) cited in the application column 3, line 31 -column 4, line 38; claim 1	27-37, 147-151
A	US 5 985 271 A (FISCHETTI VINCENT ET AL) 16 November 1999 (1999-11-16) cited in the application column 3, line 32 -column 4, line 40; claim 1	27-37, 147-151
A	US 6 017 528 A (FISCHETTI VINCENT ET AL) 25 January 2000 (2000-01-25) cited in the application column 2, line 39 -column 5, line 8; claims 1-28	27-37, 147-151

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/13649

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 1-26, 57-76, 86-94, 103-114, 125-146 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [ ] Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

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